

# UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 27538

CSAH NO. 52 (HENNEPIN AVENUE)

OVER THE

EAST CHANNEL OF THE MISSISSIPPI RIVER

DISTRICT 5 - HENNEPIN COUNTY

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PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 119)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 27538, Piers 2 and 3, were found to be in good condition with no defects of structural significance observed. A light accumulation of timber debris was observed along the upstream nose of Pier 2. The channel bottom around the substructure units has displayed some significant changes since the previous underwater inspection, dated September 1992, including a scour depression which has exposed a portion of the footing at Pier 2. Otherwise, the channel bottom configuration was comparable to what was last noted.

INSPECTION FINDINGS:

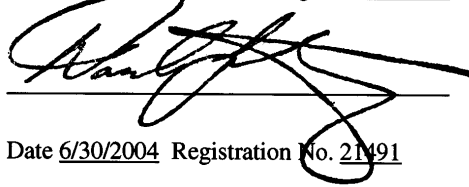
- (A) A scour depression that has exposed a portion of the footing was observed at the upstream nose of Pier 2. The scour depression was approximately 6 feet in diameter with a depth of 4 feet, and the scour has exposed the pier footing 4 feet along the horizontal face and 1 foot along the vertical face of the footing.
- (B) A light accumulation of timber debris, mainly smaller branches, was on the channel bottom at the upstream nose of the pier.

RECOMMENDATIONS:

- (A) Monitor the scour depression with footing exposure during future underwater inspections, and if the condition is found to be worsening, countermeasures may become warranted.
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

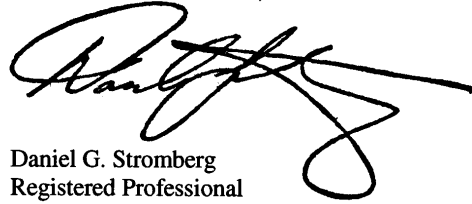
Daniel G. Stromberg

A large, stylized handwritten signature of Daniel G. Stromberg in black ink, written over a horizontal line.

Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

A large, stylized handwritten signature of Daniel G. Stromberg in black ink, written over a horizontal line.

Daniel G. Stromberg  
Registered Professional  
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 27538

Feature Crossed: The East Channel of the Mississippi River

Feature Carried: CSAH No. 52 (Hennepin Avenue)

Location: District 5 – Hennepin County

Bridge Description: The bridge superstructure consists of four spans of multiple steel beams. The superstructure is supported by two reinforced concrete abutments and three reinforced concrete piers. The piers are numbered 1 through 3 starting from the west end of the bridge. Piers 1 through 3 are supported by spread footings founded on sandstone.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker, P.E.

Dive Team: Michelle D. Koerbel, Clayton G. Brookins

Date: September 29, 2002

Weather Conditions: Overcast, " 55E` F

Underwater Visibility: " 1 Foot

Waterway Velocity: Negligible / None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2

General Shape: Piers 1 and 2 each are rectangular with two columns and an open web that sit on a lower rectangular shaft with rounded noses. The piers are founded on a rectangular spread footing which is founded on sandstone.

Maximum Water Depth at Substructure Inspected: Approximately 11 feet.

4. WATERLINE DATUM

Water Level Reference: The benchmark reference located on Pier 3.

Water Surface: The waterline was approximately 4 feet below reference.  
Waterline Elevation = 799.1.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

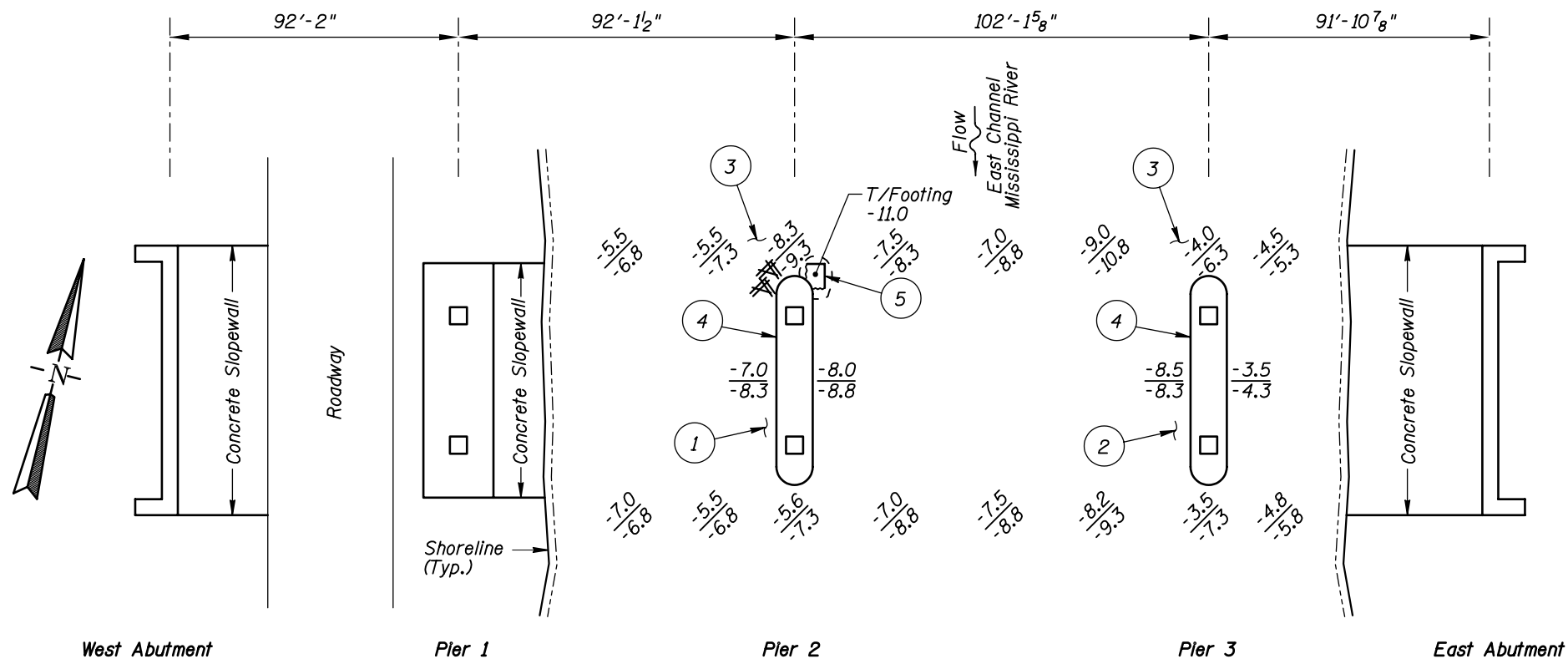
Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/09/02

Item 113: Scour Critical Bridges: Code N/02

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

\_\_\_\_\_ Yes   X   No



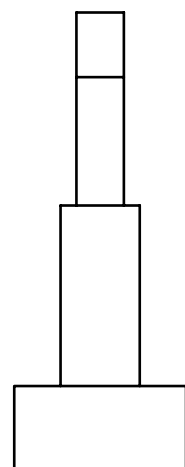
**SOUNDING PLAN**

**GENERAL NOTES:**

1. Piers 2 and 3 were inspected underwater.
2. At the time of inspection on September 29, 2002 the waterline was located approximately 4.0 feet below the benchmark reference at Elevation 803.5 on Pier 3. Based on the reference this corresponds with a waterline elevation of 799.1.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.


**INSPECTION NOTES:**

- 1 The channel bottom material around Pier 2 consisted of silty sand with up to 1 foot of probe rode penetration.
- 2 The channel bottom material around Pier 3 consisted of silty sand with up to 1 foot of probe rode penetration and scattered riprap typically less than 1 foot in diameter except at the pier noses where the riprap was 2 to 4 feet in diameter.
- 3 Light accumulation of timber debris, mainly smaller branches, on the channel bottom at the upstream nose of the pier.
- 4 The concrete at Piers 1 and 2 was overall in good condition from the waterline to the mudline with minor scaling and a 1/8 inch layer of aquatic growth.
- 5 Scour depression that exposed a portion of the footing was observed at the upstream nose of the pier. The scour depression was approximately 6 feet in diameter and 4 feet in depth, exposing 4 feet along the horizontal face and 1 foot along the vertical face of the footing.



**TYPICAL END VIEW OF PIERS 2 AND 3**

**Legend**

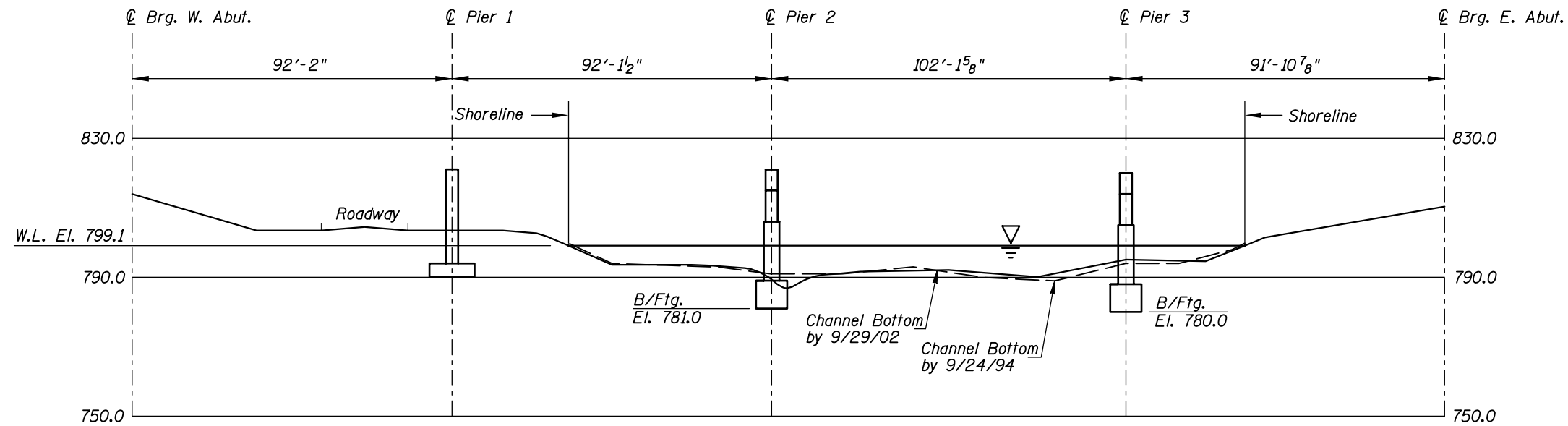
- 3.0 Sounding Depth from Waterline (9/28/02)  
-3.0 Sounding Depth from Waterline (9/24/92)  
 Timber Debris

**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

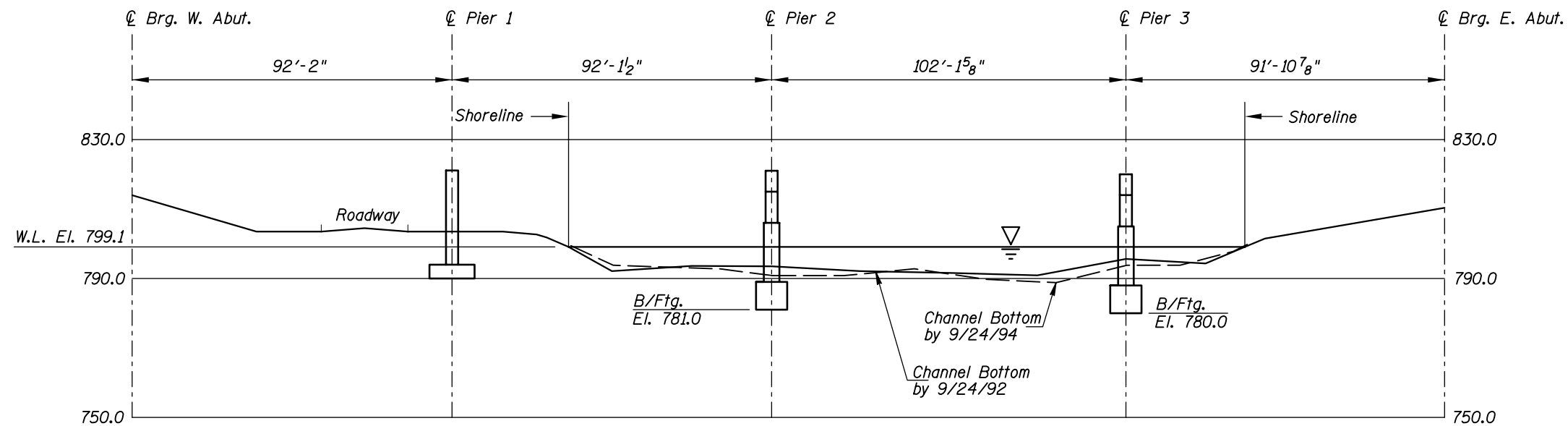
STRUCTURE NO. 27538  
OVER THE EAST CHANNEL OF THE MISSISSIPPI RIVER  
DISTRICT 5, HENNEPIN COUNTY

**INSPECTION AND SOUNDING PLAN**

Drawn By: PRH	<b>COLLINS ENGINEERS, INC.</b>	Date: SEPT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120119		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 27538  
OVER THE EAST CHANNEL OF THE MISSISSIPPI RIVER  
DISTRICT 5, HENNEPIN COUNTY

**UPSTREAM AND DOWNSTREAM  
FASCIA PROFILES**

Drawn By: PRH  
Checked By: MDK  
Code: 35120119

**COLLINS ENGINEERS, INC.**  
300 W. WASHINGTON, STE. 600  
CHICAGO, ILLINOIS 60606  
(312) 704-9300

Date: SEPT. 2002  
Scale: 1"=40'  
Figure No.: 2





Photograph 1. Overall View of Structure, Looking East.



Photograph 2. View of Pier 2, Looking East.





Photograph 3. View of Pier 3, Looking Southwest.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES  
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: September 29, 2002

ON-SITE TEAM LEADER: Shirley M. Walker, P.E.

BRIDGE NO: 27538

WEATHER: Overcast, " 55E F

WATERWAY CROSSED: The East Channel of the Mississippi River

DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR

OTHER

PERSONNEL: Michelle D. Koerbel, Clayton G. Brookins

EQUIPMENT: Scuba, U/W Light, Probe Rod, Lead Line, Sounding Pole, Scraper, Camera

TIME IN WATER: 11:50 a.m.

TIME OUT OF WATER: 12:25 p.m.

WATERWAY DATA: VELOCITY Negligible / None

VISIBILITY " 1 foot

DEPTH 11 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the concrete piers were in good condition with no defects of structural significance observed. A light accumulation of timber debris was observed at the upstream end of Pier 2. There was a scour depression at the upstream nose of Pier 2 that has exposed a portion of the footing with up to 1 foot of vertical exposure.

FURTHER ACTION NEEDED: \_\_\_\_\_ YES \_\_\_\_X\_\_\_\_ NO

Monitor the scour depression with footing exposure during future underwater inspections, and if the condition is found to be worsening, countermeasures may become warranted.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 27538  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Shirley M. Walker, P.E.  
WATERWAY CROSSED The East Channel of the Mississippi River

INSPECTION DATE September 29, 2002  
NOTE: USE ALL APPLICABLE CONDITION  
DEFINITIONS AS DEFINED IN THE MINNESOTA  
RECORDING AND CODING GUIDE INCLUDING  
GENERAL, SUBSTRUCTURE, CHANNEL AND  
PROTECTION, AND CULVERTS AND WALL  
DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 2	11.0'	N	7	7	9	N	7	6	N	N	8	6	7	N	N	8	N	N
	Pier 3	8.3'	N	7	N	9	N	7	8	N	N	8	8	7	N	N	8	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete piers were in good condition with no defects of structural significance observed. A light accumulation of timber debris was observed at the upstream end of Pier 2. There was a scour depression at the upstream nose of Pier 2 that has exposed a portion of the footing with up to 1 foot of vertical exposure.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.  
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.